TRAUMATIC BRAIN INJURY – ANALYSIS OF PROGNOSTIC FACTORS BASED ON SYMPTOMATOLOGY AND RADIOLOGY

Neurosurgery

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ABSTRACT

Head injury represents a challenging issue for clinicians, biomechanical engineers and medico-legal experts (1).Predicting the outcome of Traumatic brain Injury(TBI) has been an enigma to clinicians especially neurosurgeons. This study aims to analyse the presenting complaints, Glasgow coma scale (GCS), types of injuries and their sensitivity, specificity, positive and negative predictive values. In this study, 183 paediatric cases, 2260 adults and 507 geriatric cases were analyzed. In adults and geriatric population , men were found to be have a higher incidence. In symptoms, vomiting was the commonest symptom in paediatric age group while Loss of consciousness was found to be a common symptom in other ages. Though all the symptoms had a high specificity, sensitivity was low. GCS was found to have a high sensitivity, specificity, positive and negative predictive values.

KEYWORDS

Traumatic Brain Injury, Epidemiology , Gcs

Introduction:-

Neurotrauma is one of the leading causes of death and disability worldwide.[2] To know the pattern of injuries and their prognosis has been a quest for eons. The need to diagnose and come up with a prognosis with accuracy is a prerequisite for proper management of traumatic brain injury. Epidemiologic monitoring of traumatic brain injury (TBI) is very seldom performed in a standardized way and is totally absent in many parts of the world. This study aims at identifying the factors which may help in managing TBI better.

AIMS OF THE STUDY:-

To study the cause presenting symptoms, admitting GCS, type of Injuries, treatment given and the condition on discharge of patients with traumatic brain injury during the year of 2016, in Institute of neurosurgery, Madras Medical College, Chennai.

Materials and methods:-
Inclusion criteria:-
All the cases, admitted with history of trauma during the year 2016 and taken over by the Institute of neurosurgery, RGGGH, Chennai were studied

Exclusion criteria:-
• All the cases, who were discharged at request or against medical advice were excluded.
• Patients with incomplete data were excluded.

Methodology:-
The data of all cases admitted with the history of trauma during the year 2016 were collected and compiled. Those who were discharged at request or against medical advice before a proper diagnosis were eliminated. Those with incomplete data were also eliminated. The remaining data was analysed by SPSS software version 23.

Observation:-
A total of 2950 cases were included in the study. Of which 183 were of paediatric age group(<12 years), 507 were geriatric cases(>60 years) and 2260 were adults (12- 60 years). The age distribution was from 2 months of age to 92 years of age. There were 508 female cases and 2442 were male. The sex distribution was almost equal in paediatric cases (82 female and 101 male) and 28.2% were female in geriatric age group (143 female and 364 male). But the ratio was more skewed towards men in the adult population, where only 12.5% were female (283 female and 1977 male).

The presenting complaints were analyzed. In children, vomiting was the most common presenting complaint with 66.1% of cases presenting with it. Convulsion was seen in only 14.7% of paediatric near half the value seen in adults and geriatric cases. In geriatric age group, loss of consciousness (LOC) was the commonest presenting

complaint followed by vomiting and convulsions. In adults, 66.2% of cases were admitted with the presenting complaint of LOC while 60.5% of cases presented with vomiting. ENT bleed as a presenting complaint was present In 28.9% of adult cases, which is very high compared to other age groups in which ENT bleed was present only in 8% of cases.

Table 1:- Distribution of symptoms according to age

|	Children		Geriatric		Adults	
Vomiting	121	66.1%	213	42%	1367	60.5%
LOC	84	46%	279	55%	1495	66.2%
Convulsion	27	14.7%	171	33.7%	542	24%
ENT bleed	16	8%	45	8.8%	654	28.9%

In the paediatric age group, fractures were the commonest type of injury accounting for 127 of 183 cases. Isolated fractures are seen in 50% of cases. Extra dural haemorrhage (EDH), Subdural haemorrhage, contusions and concussions occupy very small portion of affected population.

**Fig 1:- Radiological findings in paediatric population**
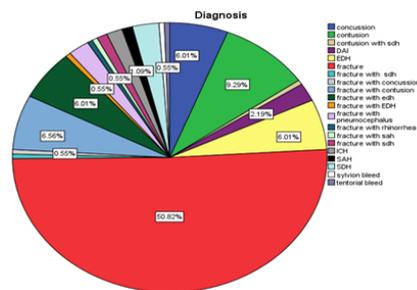
In the adult population, the commonest injuries were contusions closely followed by fractures. Moreover, the distribution was fairly equal with all the above diagnosis.

Fig 2:- Radiological finding in adult population
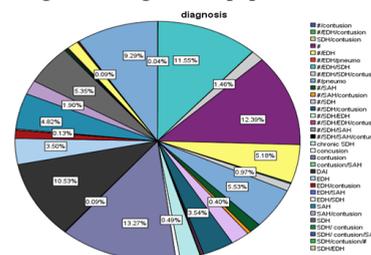
In old age, the commonest diagnosis was contusion (27.42%) followed by SDH (17.75%). Chronic SDH, which is usually thought of as a very common diagnosis in the old age, account only for 6.71% of cases.

Fig 3:- Radiological finding in geriatric patients
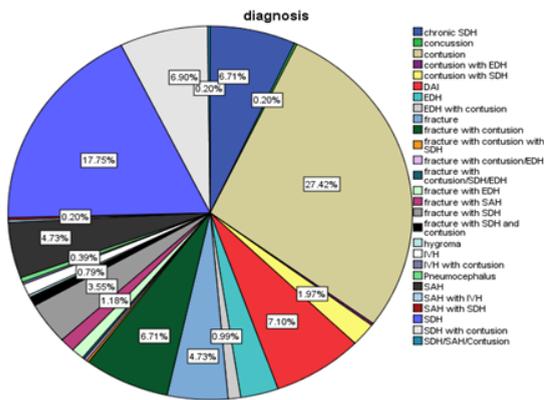
In the paediatric population, only 13.11% of cases underwent surgical management. In the adult population, 21.59% of cases underwent surgical management, while in geriatric cases, 25.84% of cases underwent surgical management. The rest underwent conservative treatment.

In the paediatric population, only 3 patients expired, of which 2 cases expired after conservative management and 1 case expired after decompressive craniectomy following contusion. In adult population, 29.5% of cases (666 cases) expired. 20.4% of cases managed conservatively and 9.42% of cases managed by surgical means expired.

Fig 4- Distribution of death in adult population according to treatment modality
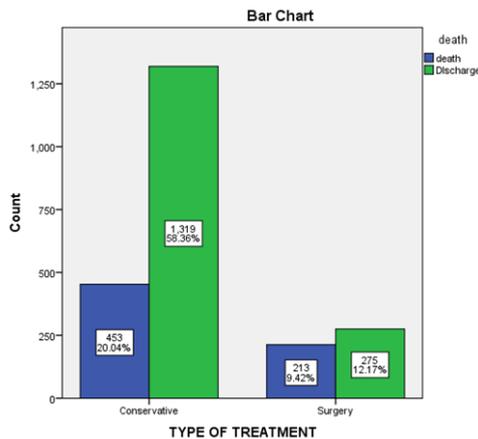
Of these cases, the distribution was skewed towards death in cases with diffuse axonal injury and those who presented with SDH and contusions. In geriatric group, death was very high at 46.75%. 210 cases managed conservatively and 60 cases managed surgically expired. Death was equally distributed amongst all diagnosis but as in adults, death was more in Diffuse axonal injury patients.

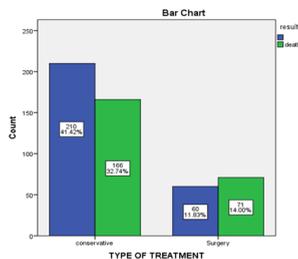**Fig 5:- Distribution of death in geriatric cases**

Table 2:- Glascow outcome score in various age groups

GOS	CHILDREN	ADULT	GERIATRIC
5	119	1103	143
4	38	298	96
3	22	156	26
2	1	37	5
1	3	666	237
	183	2260	507

When Glascow outcome score was compared to age group, paediatric age group had much better prognosis than other age groups. The symptoms and GCS were analyzed for their sensitivity, specificity, positive and negative predictive value. Though vomiting, convulsion and loss of consciousness had good specificity the sensitivity was poor. GCS had good sensitivity, specificity, positive and negative predictive value. The difference in sensitivity between the symptoms and GCS were analyzed and the p value was significant (<0.001).

Table 3 :- Predictive capability of symptoms and GCS.

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Vomiting	2.46%	100%	100%	34.25%
Convulsion	3.7%	98.72%	33.33%	85.56%
Loss of consciousness	3.57%	100%	100%	55%
GCS	100%	92.78%	98%	100%

Inference:-
The sex distribution in patients with traumatic brain injury is skewed towards men in adult and geriatric population while it is almost equal in paediatric age group. Loss of consciousness is the most common presenting symptom in adults and geriatric age group while vomiting was the most common symptom in paediatric age group. In paediatric age group, fractures were the most common diagnosis, while in adults and geriatric age groups , contusions were the most common diagnosis. Prognosis was worse in geriatric age group with death in 46.75% of cases while paediatric cases had the best prognosis with only 3 deaths in 183 cases. Of the symptoms and GCS, GCS has the best sensitivity, specificity, positive and negative predictive values and is the best factor for predicting prognosis.

Conclusion:-
It is the leading cause of mortality and disability among young individuals in high income countries and can have profound effects across the lifespan. Worldwide, the incidence of TBI is rising sharply, mainly because of increasing use of motor vehicles in low- and middle income countries. [3] The ability to predict the outcome plays an important part in managing TBI. GCS has provided a systematic way to predict the outcome. In clinical practice, the overall reliability of the GCS seems to be adequate. However, ''adequate'' should not be considered sufficient.[3]. Constant data collection and analysis for factors which may add to predicting the outcome of traumatic brain injury is essential for its treatment.

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